



B.C.A. I Semester Degree Examination, April/May - 2024

COMPUTER SCIENCE

Mathematical Foundation

(NEP)

Time : 2 Hours

Maximum Marks : 60

SECTION - A

Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**

1. (a) Write the negation of the following statement
"The sum of 3 and 4 is 9".
- (b) Check whether the following sentence is statement
"There are 35 days in a month".
- (c) Find adjoint of matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.
- (d) Find the Rank of the following matrix $\begin{bmatrix} 1 & 1 & 3 \\ 0 & 2 & -6 \\ 0 & 0 & 4 \end{bmatrix}$.
- (e) Find the degree measure to radian $\frac{5\pi}{3}$.
- (f) Find $\tan x$, if $\cot x = \frac{3}{4}$ lies in third quadrant.
- (g) Evaluate : $\lim_{x \rightarrow 2} \frac{x+1}{x-1}$
- (h) Differentiate x^2+3x+2 w.r.t x .
- (i) Evaluate : $\int_0^2 x^7 dx$
- (j) Evaluate : $\int 4x^3 - 6 dx$



SECTION - B

Answer **any four** of the following questions. Each question carries **five** marks.

4x5=20

2. Prove the following by truth table

$$\sim(p \Rightarrow q) = \sim(\sim p \vee q).$$

3. Find the Inverse of a matrix $A = \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix}$.

4. Prove that

$$\sin^2 \frac{\pi}{6} + \cos^2 \frac{\pi}{3} - \tan^2 \frac{\pi}{4} = \frac{-1}{2}$$

5. Evaluate : $\lim_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$

6. Evaluate : $\int x \cos x \, dx$

7. State and verify the property 1 of determinants $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$.

SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks.

3x10=30

8. (a) Define contradiction with example.
(b) Show that the proposition $(p \vee q) \wedge (\sim p \wedge \sim q)$ is a contradiction.

9. Solve the following by Cramer's rule.

$$\begin{aligned} x + y + z &= 6 \\ x - y + z &= 2 \\ 2x + y - z &= 1 \end{aligned}$$

10. If $\cos x = \frac{-1}{2}$ where x lies in 3rd quadrant then find all the remaining trigonometric ratios.

11. Differentiate :

- (a) $\sin(x^2 + 5)$ w.r.t. x .
(b) Differentiate : $x^2 \sin x$ w.r.t. x .

12. Evaluate : $\int_0^2 \int_1^3 xy^2 \, dy \, dx$

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